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(54) **LOCKING DEVICE OF A GAS VALVE**

(57) The object of the invention is to eliminate an unauthorized opening of the gas valve. The invention has a first body part (6A) and a second body part (6B). The both body parts have a slot (7A, 7B), which shape is arranged to match with a body (2) of the gas valve (1). The first body part has also a cylinder body (11), which has an inner space (12) having a lock cylinder (17).The locking device has also a cover (14) that is on a handle of the gas valve and cannot be turned when the lock cylinder is locked.

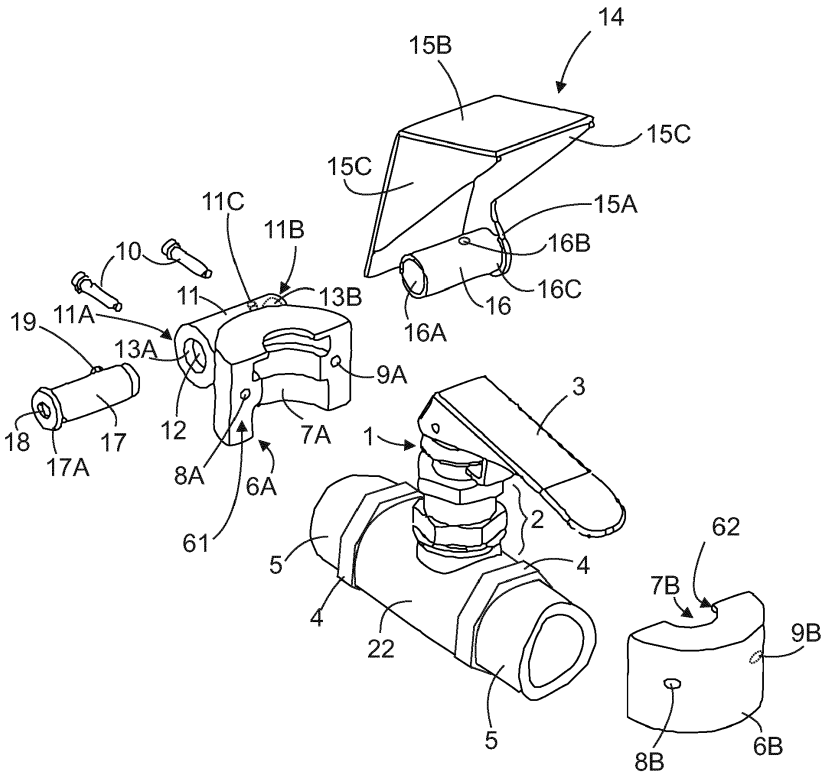

FIG. 3

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Description

Field of technology

[0001] The invention relates to a locking device of a gas valve. The gas valve is a type of valve that is, for example, used in tank trucks.

Prior art

[0002] Tank trucks are used to transfer gas especially locations wherein there are no distribution pipelines for gas. In order to fil the tank of a tank truck, there is at least one pipe for gas. The same pipe, or another pipe, can also be used for emptying the tank. The pipe or pipes are provided with a gas valve in order to open and to close the flow of gas.

[0003] The gas valve used in the gas truck is also provided with a plate in order to prevent accidental opening of the gas valve. The plate keeps the gas valve in a closing position so that for example movement of the gas truck or a careless movement of a hand does not open the gas valve. Different plates have been used generally for this purpose. For example US 2632623 discloses a plate for a gas valve to prevent accidental opening.

[0004] It has been noticed that at least part of the gas in the tank may disappear during transportation. So it has been deduced that an unauthorized opening of the gas valve may happen.

Short description

[0005] The object of the invention is to eliminate the problem said above. The object is achieved in a way described in the independent claims. Dependent claims illustrate different embodiments of the invention.

[0006] A locking device of a gas valve 1 according to the invention has a first body part 6A and a second body part 6B. The both body parts have a slot 7A, 7B, which shape is arranged to match with a body 2 of the gas valve 1, The first and the second body part has also fixing holes 8A, 8B, and the locking device also comprises at least one fixing bolt 10 for the fixing holes in order to fix the first body part 6A and the second body part 6B against each other.

[0007] The first body part has also a cylinder body 11, which has an inner space 12 and openings 13A, 13B at a first end 11A and a second end 11 B of the cylinder body. In the cylinder body, there is a cavity 11C that is in connection with the inner space.

[0008] The locking device has also a cover 14 that is provided with a hollow rod 16, the hollow rod having an open end 16A and a side hole 16B. The hollow rod is in the inner space 12 of the cylinder body.

[0009] The locking device has also a lock cylinder 17 having projection 19, which is spring biased, and a first end 17A with a key hole 18. The lock cylinder is in the cylinder body 11 and in the hollow rod 16 in such a way that the projection 19 is in the side hole 16B of the hollow rod, locking the lock cylinder 17 and the cover 14 with the cylinder body 11. The first end 17A of the lock cylinder 17 and the cover 14 are at least partly above the fixing holes 8A, 9A of the first body part 6A.

[0010] The cover 14 is arranged to prevent opening of the gas valve 1 when the lock cylinder 17 is locked. In the locked state the projection 19 is partly in the cavity 11C. The cover is also arranged to be turnable when the cylinder lock is unlocked, in which state the projection is at least sufficiently out of the cavity 11C, and so the gas valve can be opened.

List of figures

[0011] In the following, the invention is described in more detail by reference to the enclosed drawings, where

- Figure 1 illustrates an example of a locking device according to the invention in an opening position,
- Figure 2 illustrates the locking device of Figure 1 in a locked position, and,
- Figure 3 illustrates an example of an exploded view of the embodiment of Figure 1.

Description of the invention

[0012] Figure 1 shows a locking device according to the invention in an opening position. As can be seen, the locking device has a cover 14 that is arranged to cover a part of the gas valve 1 when the locking device is in a locked position, which is illustrated in Figure 2. As showed in the figures the cover provides a cavity 20 for said part of the gas valve 1. The part is a handle 3 that is used to open and to close the gas valve 1.

[0013] The gas valve 1 is also showed in Figure 3 which shows an exploded view of the locking device. The gas valve of Figure 3 is a certain type of gas valve for opening and closing the valve in order to allow or hinder gas flow in a pipe 5. The gas valve 1 has a body 2 which comprises valve devices to provide said opening and closing functions. The valve devices are not showed in the figures and they are not a part of the invention, as the gas valve itself is not a part of the invention. The body 2 has also an arm body 22 as showed in Figure 3. Between the arm body of the gas valve and the pipe 5 there are connections 4, which are used for attaching the gas valve with the pipe, and which do not allow the gas flow out of the pipe.

[0014] In addition the gas valve comprises a hook plate 3A, which is intended to keep the handle 3 in a closing position. In the closing position the hook plate is partly against a projection plate 2A of the body 2. The hook plate is then against an under surface 2C of the projection plate 2A. In this way, the movements of a gas truck should not accidentally open the gas valve 1.

[0015] However, the gas valve 1 has not a locking function, which means that the handle 3 can be turned open

at any suitable time. Since it is desired that the gas valve operates properly, the structure of the gas valve should not be modified. In fact, some regulations forbid any modifications. The locking device according to the invention provides the locking function without any modification of the gas valve 1.

[0016] When looking at Figure 3 structures of the invention can be observed. A locking device of a gas valve 1 according to the invention has a first body part 6A and a second body part 6B. The both body parts have a slot 7A, 7B. A shape of the slot of each body part is arranged to match with a body 2 of the gas valve 1. The matching means in this context that the shapes of the slots does not need to follow exactly the shapes of the body 2 of the gas valve, but to provide suitable space for the body.

[0017] The first and the second body part have also fixing holes 8A, 8B, 9A, 9B and the locking device also comprises fixing bolts 10 for the fixing holes in order to fix the first body part 6A and the second body part 6B against each other. By using the fixing bolts in the fixing holes a tight connection can be provided, which can stand well against breaking efforts. The fixing bolts and the fixing holes can be threaded.

[0018] Another embodiment of the invention is that there is a hinge between the first body part 6A and the second body part 6B and a fixing bolt and fixing holes on the other side of the body parts. In the embodiment the body parts are turned towards each other and in this way covering a part of the body 2 of the gas valve. The fixing bolt and the fixing holes are used to finish the fixing of the turned body parts.

[0019] The first body part has also a cylinder body 11, which has an inner space 12 and openings 13A, 13B at a first end 11A and at a second end 11B of the cylinder body. The locking device has also a cover 14 that is provided with a hollow rod 16, which has an open end 16A and a side hole 16B. The hollow rod is situated in the inner space 12 of the cylinder body 11. Inside the cylinder body there is a cavity 11C, which is in connection with the inner space.

[0020] The locking device has also a lock cylinder 17 having projection 19 that is spring biased, and a first end 17A with a key hole 18. The lock cylinder is situated in the cylinder body 11 and in the hollow rod 16 in such a way that the projection 19 is in the side hole 16B of the hollow rod, locking the lock cylinder 17 and the cover 14 with the cylinder body 11. The spring that biases the projection out of the lock cylinder is arranged to push the projection out in such a way that projection is in the side hole 16B of the hollow rod in all states of the lock cylinder, like in a locked state and in an unlocked state.

[0021] The first end 17A of the lock cylinder and the cover 14 (more precisely the fixing part 15A of the cover) are against the ends 11A, 11B of the cylinder body and therefore keep the lock cylinder 17 and the hollow rod 16 in the cylinder body in this arrangement.

[0022] The cylinder body protects and covers the hollow rod and the lock cylinder. The hollow rod covers also the lock cylinder. So, the cylinder body 11 covers the locking connection provided by the projection 19.

[0023] The first end 17A of the lock cylinder 17 and the cover 14 are at least partly above the fixing holes 8A, 9A of the first body part 6A, which means that they prevent rotation of the fixing bolts 10 in order to remove them from the fixing holes 8A, 9A, 8B, 9B. The cover 14 is arranged to prevent opening of the gas valve 1 when the lock cylinder 17 is locked. This can be seen in Figure 2 wherein the cover prevents the turning of the handle 3. In the locked state the top of the projection 19 is in the cavity 11C, and so the cover cannot be turned open. In other words, the projection 19 is partly in the cavity 11C.

[0024] The cover 14 is also arranged to be turnable when the cylinder lock is unlocked. In this state the projection 19 is at least sufficiently out of the cavity 11C in order to allow opening of the gas valve. At least sufficiently out of the cavity means that if the top of the projection is still in the cavity, it does not hinder the turning of the cover (and the lock cylinder). If the projection is out of the cavity, it is clear that it does not hinder the turning of the cover.

[0025] As can be seen from Figure 2 the cover 14 is arranged to cover a part of the gas valve when lock cylinder is locked and to provide a cavity 20 for said part of the gas valve. The cover can be provided with a fixing part 15A whereto the hollow rod 16 is fixed providing a closed end 16C of the hollow rod 16. The cover 14 can be formed in such a way that it has an upper plate part 15B and side plates 15C, wherein another of the side plates provides said fixing part 15A.

[0026] The first body part 6A and the second body part 6B has a surfaces 61, 62 which are arranged to be against each other when fixing first and second body parts together. The surfaces can be flat which are easy to manufacture. The surfaces may alternative have matching forms, like projections and recesses, in order to provide additional security between the connection of the first and the second parts.

[0027] The first end 17A of the lock cylinder provides a protection part that is arranged to cover the opening 13A of the first end 11A of the cylinder body. So as can be seen the lock cylinder which can opened by a key and also can be locked is protected by the first end, the cylinder body 11 and cover 14. The first body part 6A and the second body part 6B cover most of the body 2 of the gas valve and the cover 14 covers at least part of the handle 3 of the gas valve at the locking position. As said the locking position is illustrated in Figure 2. At the locked position the cover 14 cannot be turned. It can be noted that the locking device provides a good protection against unauthorized opening of the valve. In addition, it is not needed to modify the gas valve itself. So, when the lock cylinder 17 is locked the cover 14 covers at least part of the handle and the cover cannot be turned open due to the projection 19. When the lock cylinder is opened by the key the projection is pulled towards the cylinder 17 and out of the cavity. Then cover 14 can be turned open

in order to allow opening of the gas valve. Due to the projection 19 in the side hole 16B the lock cylinder 17 turns as well.

[0028] It is evident from the above that the invention is not limited to the embodiments described in this text but can be implemented in many other different embodiments within the scope of the independent claim.

Claims

1. A locking device of a gas valve (1), **characterised in that** it has a first body part (6A) and a second body part (6B), the both body parts having a slot (7A, 7B), a shape of the slot of each body part being arranged to match with a body (2) of the gas valve (1), the first and the second body part having also fixing holes (8A, 8B, 9A, 9B), the locking device also comprising at least one fixing bolt (10) for the fixing holes in order to fix the first body part (6A) and the second body part (6B) against each other, the first body part having also a cylinder body (11), the cylinder body having an inner space (12) and openings (13A, 13B) at a first end (11A) and a second end (11 B) of the cylinder body, the cylinder body having also a cavity (11C) in connections with the inner space (12),
   the locking device having also a cover (14) that is provided with a hollow rod (16), the hollow rod having an open end (16A) and a side hole (16B), and the hollow rod being in the inner space (12) of the cylinder body,
   the locking device having also a lock cylinder (17) having a projection (19), which is spring biased, and a first end (17A) with a key hole (18), the lock cylinder being in the cylinder body (11) and in the hollow rod (16) in such a way that the projection (19) is in the side hole (16B) of the hollow rod, locking the lock cylinder (17) and the cover (14) with the cylinder body (11), the first end (17A) of the lock cylinder (17) and the cover (14) being at least partly above the fixing holes (8A, 9A) of the first body part (6A),
   the cover (14) being arranged to prevent opening of the gas valve (1) when the lock cylinder (17) is locked in which state the projection (19) is partly in the cavity (11 C), and the cover (14) being arranged to be turnable when the cylinder lock is unlocked, in which state the projection (19) is at least sufficiently out of the cavity (11C), in order to allow opening of the gas valve.

2. A locking device of a gas valve (1), according to claim 1, **characterised in that** the cover (14) is arranged to cover a part of the gas valve (1) when lock cylinder is locked and to provide a cavity for said part of the gas valve.

3. A locking device of a gas valve (1), according to claim 1 or 2, **characterised in that** the cover has a fixing part (15a) whereto the hollow rod (16) is fixed providing a closed end (16c) of the hollow rod (16).

4. A locking device of a gas valve (1), according to claim 1 **characterised in that** the cover (14) has an upper plate part (15B) and a side plates (15C), wherein another of the side plates provides said fixing part (15A).

5. A locking device of a gas valve (1), according to Claim 4, **characterised in that** the first body part (6A) and the second body part (6B) has a surfaces (61, 62) which are arranged to be against each other when fixing first and second body parts together.

6. A locking device of a gas valve (1), according to Claim 4, **characterised in that** the surfaces (61, 62) are flat.

7. A locking device of a gas valve (1), according to Claim 4, **characterised in that** the surfaces (61, 62) has matching forms.

8. A locking device of a gas valve (1), according to Claim 4, **characterised in that** the first end (17A) of the lock cylinder provides a protection part that is arranged to be fixed into the opening (13A) of the first end (11A) of the cylinder body, covering said opening.

9. A locking device of a gas valve (1), according to any of Claim 1 - 8, **characterised in that** the locking device also comprises another fixing bolt (10) and further fixing holes (9A, 9B), for the other fixing bolt (10).

10. A locking device of a gas valve (1), according to any of Claim 1 - 8, **characterised in that** the locking device also comprises a hinge between the first body part (6A) and the second body part (6B).

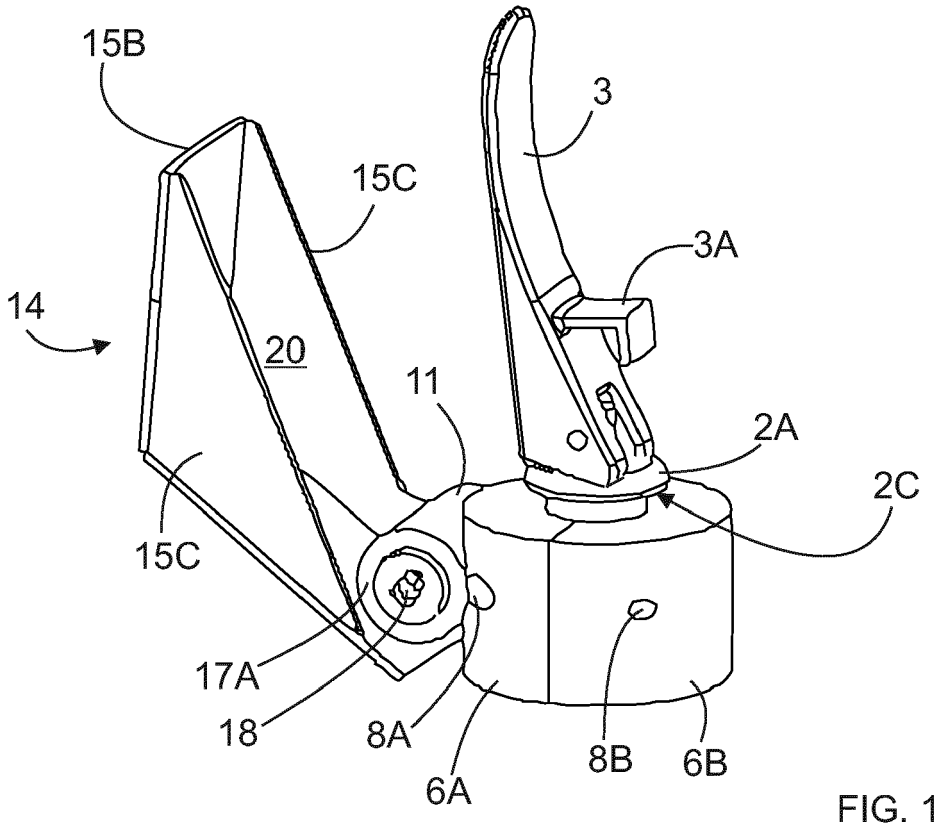
15B
3
15C
3A
14
20
11
2A
2C
15C
17A
18
8A
8B
6B
6A

FIG. 1

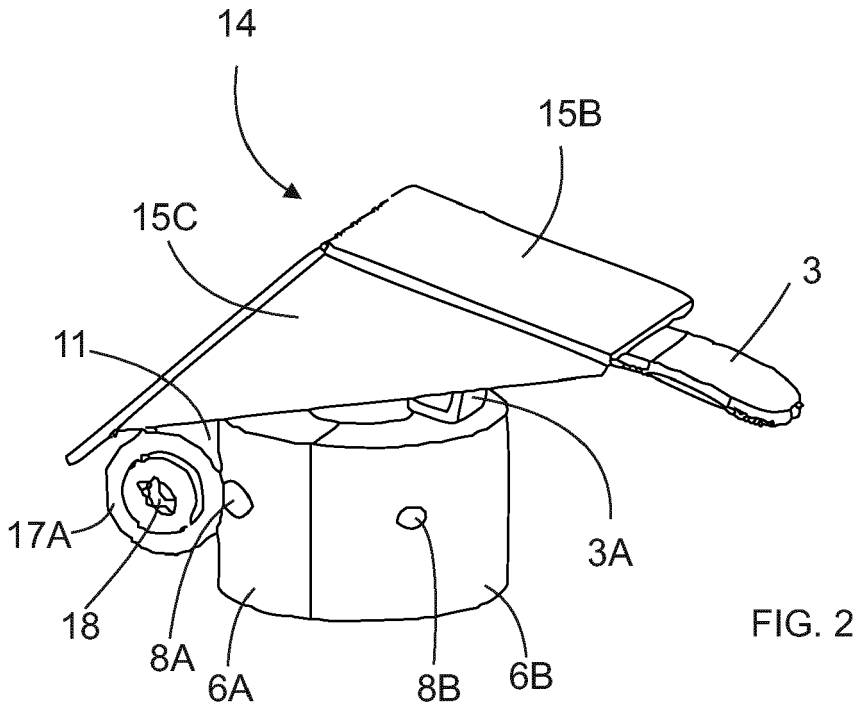
14
15B
15C
3
11
17A
3A
18
8A
6A
8B
6B

FIG. 2

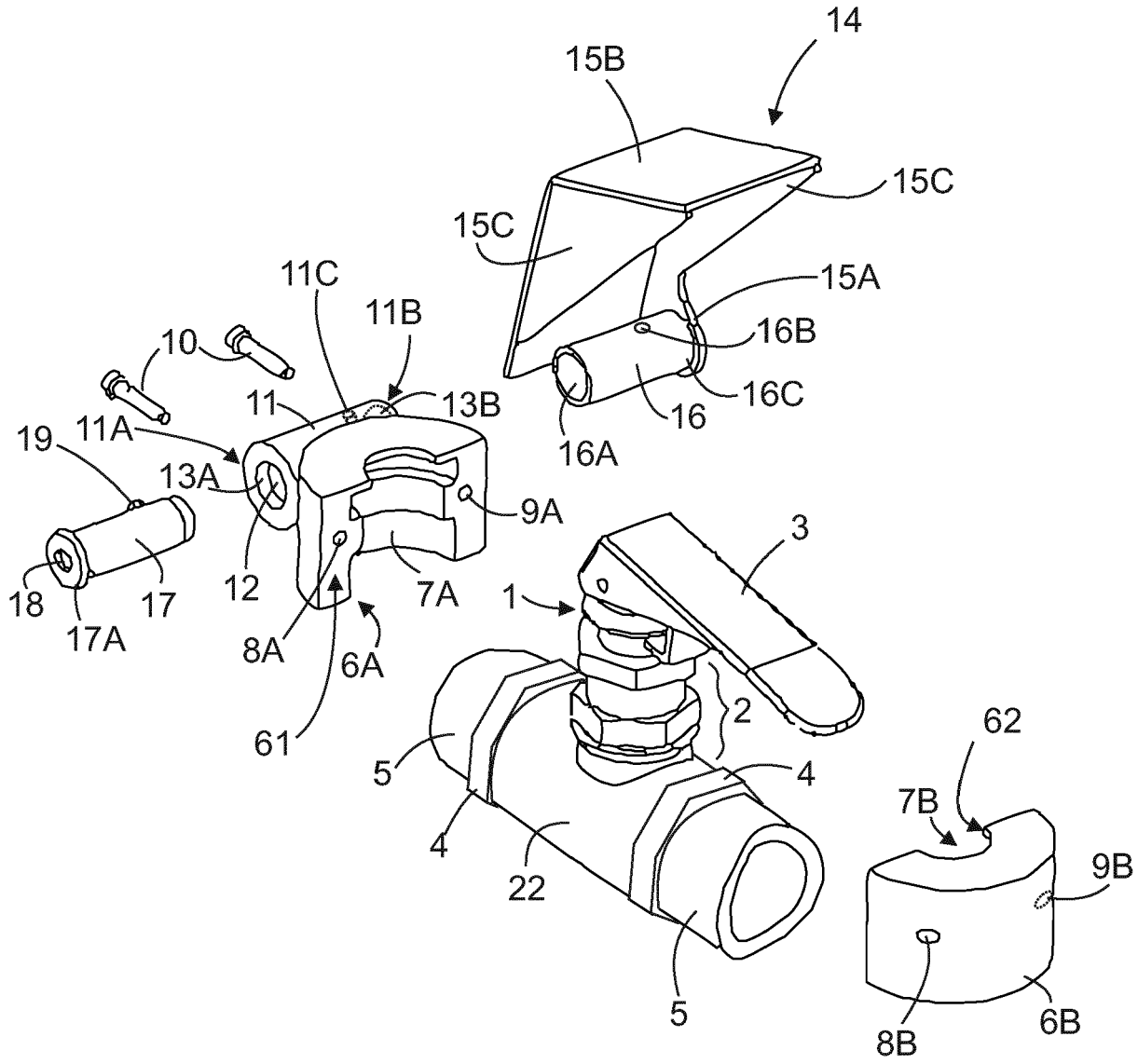
14
15B
15C
15C
15A
16B
16C
16
16A
11C
11B
10
11
13B
19
11A
13A
9A
18
17A
17
12
7A
8A
6A
61
1
3
2
5
4
4
22
5
62
7B
9B
8B
6B

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 4831

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	US 2 632 623 A (COLWELL JESS W) 24 March 1953 (1953-03-24) * column 1, lines 12-18 * * column 2, line 20 - column 3, line 13; figures 1-6 *	1	INV. F16K35/06 F16K35/10
A	US 6 994 106 B1 (HACKLEY CHARLES L [US] ET AL) 7 February 2006 (2006-02-07) * column 6, lines 26-53; figures 1,12 *	1	
A	US 2014/116536 A1 (RESENDIZ DOMINGO G [US]) 1 May 2014 (2014-05-01) * sentences 13-22, paragraph 2; figures 1-6 *	1	
A	JP S48 37414 U (CHINA INDUSTRIAL CO., LTD.) 8 May 1973 (1973-05-08) * figures 1,2 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

F16K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 August 2016	Rechenmacher, M

CATEGORY OF CITED DOCUMENTS

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12-08-2016

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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